

Taketo NAKANO* & Shinji HANDA**: *Gongrosira burmanica*
(Chlorophyceae) newly found in Japan***

中野武登*・半田信司**: 日本新産 *Gongrosira burmanica* (緑藻綱)

Members of the genus *Gongrosira* (Chaetophorales, Chlorophyceae) are found in fresh, brackish, and salt water. They usually grow on other aquatic plants at the margin of ponds and lakes, and on stones in rivers. About 20 species of this genus have been reported in the world (Printz 1964, Tupa 1974, Sarma 1986). In Japan, however, this genus has not been reported until now. In the course of our floristic investigation of freshwater algae in Hiroshima Prefecture, we collected an alga belonging to *Gongrosira* which was growing on stones in rivers. This paper provides a description, illustrations and some taxonomical notes concerning this species which is new to the Japanese algal flora.

Materials and methods The specimens were obtained from the surface of stones in rivers at various places of the eastern part of Hiroshima Pref., which will be indicated in the enumeration of the species examined. In the laboratory, the specimens were cultured in Petri dishes filled with 1N BBM solution (Bischoff & Bold 1963) under the following culture conditions: light intensity: ca 2000 lux; photoperiod: 12 hr light/12 hr dark; temperature: 20°C. Both cultured and wild specimens were observed using a light microscope. For the observations, living materials were used as much as possible. The specimens are deposited in Botanical Institute, Hiroshima University (HIRO).

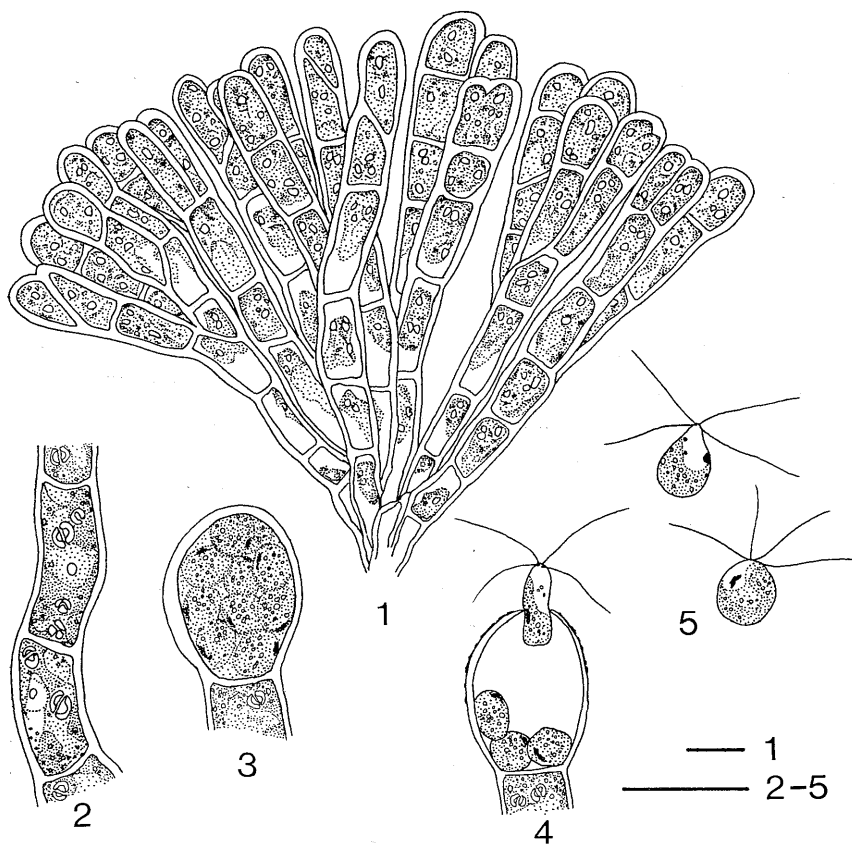
Gongrosira burmanica Skuja, Nov. Act. Reg. Soc. Sc. Upsaliensis, ser. IV, 14: 74, Tab. XIII, figs. 4-9, 1949. Printz, Hydrobiol. 24: 243, Tab. LXXI, figs. 4, 5, 1964. (Figs. 1-13)

Thallus hemispherical or rarely crust-like, black in color and about 1 mm in thickness, composed of both horizontal and vertical filaments. Horizontal fila-

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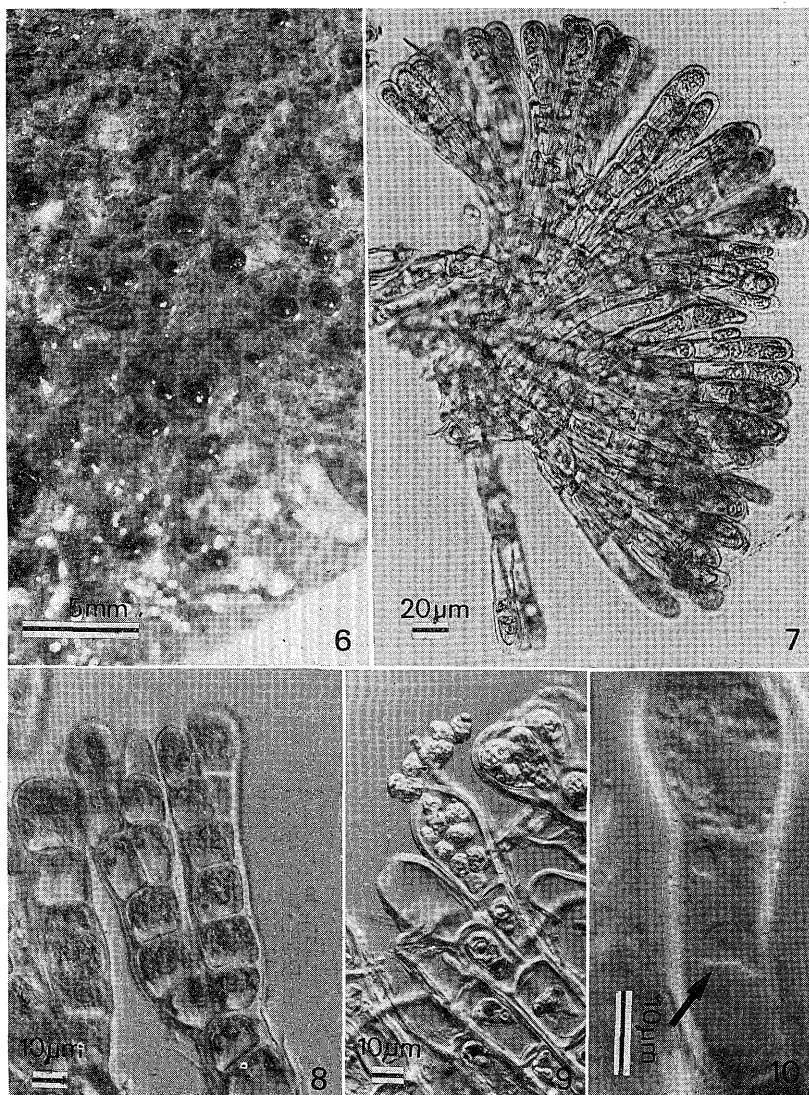
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Figs. 1-5. *Gongrosira burmanica* Skuja. 1. Radially spread filaments with dichotomous branches. 2. Portion of a filament (cultured specimen). 3. Zoosporangium. 4. Escape of a zoospore through a terminal pore of zoosporangium. 5. Quadriflagellate zoospores. Scale bars: 20 μ m.

ments reduced and indistinct, and vertical ones densely packed and radially spread from the basal cell and branched dichotomously at the middle or the upper portion. Individual cells cylindrical with parallel sides in the lower portion of filaments and somewhat barrel-shaped with swollen sides at the upper portion, (8-)15-20(-26) μ m in width and 12-50 μ m in length. Cell wall incrassate, about 1.5 μ m thick. Unicellular hair-like cells absent. Chloroplast single, parietal, usually laminate with several incisae, and with two to four pyrenoids. Subspherical apical cells with a dome-like chloroplast. Nucleus single. Asexual



Figs. 6-10. *Gongrosira burmanica* Skuja. 6. Algal colonies on stone. 7. Radially spread filaments. 8. Dichotomous branches of filaments. 9. Escape of zoospores from a zoosporangium. 10. Single nucleus in a cell (arrow).

reproduction by forming zoospores. Zoospores wallless, cylindrical, subspherical or raindrop-formed in shape, and 4–10 μm long, 3–8 μm wide, with four anterior flagella of equal length and a stigma at the anterior portion. Chloroplast located at the posterior half of the cell, without a pyrenoid. Nucleus situated at the median portion. Contractile vacuoles not observed. Akinetes and sexual reproduction not observed.

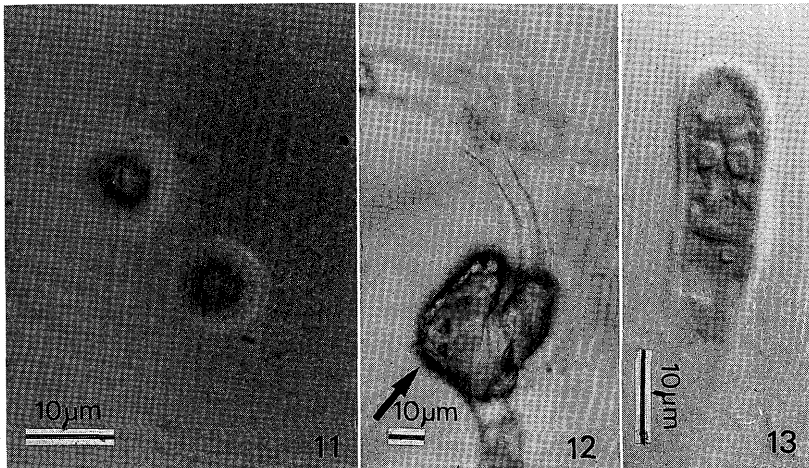
Habitat: occurring on stones in rivers.

Geographical distribution: Burma and Japan.

Specimens examined: Japan, Honshu, Hiroshima-ken, Hongô-cho, Nashiwa River, May 14, 1984 (Handa 1855); Kochi-cho, Nuta-gawa River, Jan. 11, 1985 (Handa 1874); Kochi-cho, Nuji River, Apr. 22, 1985 (Handa 1884); Takehara-shi, Shinjô-cho, Katsurako River, Feb. 10, 1984 (Handa 1848); Higashi-hiroshima-shi, Takaya-cho, Zôga River, Mar. 4, 1986 (Handa 1961).

This species is recorded from Japan for the first time.

Our alga agrees well with the description by Skuja (1949) and Printz (1964) except the absence of an incrustation with calcium carbonate on the plant body. According to the description, the alga has an incrustation of calcium carbonate, whereas the wild specimens collected by us from the field had no such incrustation. However, the cultured specimens accumulated many calcium



Figs. 11–13. *Gongrosira burmanica* Skuja. 11. Quadriflagellate zoospores. 12. Calcium carbonate grain (arrow) produced at the basal portion of a filament (cultured specimen). 13. Cell with two pyrenoids.

carbonate grains in the basal portion of the plant (Fig. 12). This fact suggests that our alga is potentially capable of secreting the calcium carbonate grains on the surface of the plant body. Therefore, we identified our alga as *Gongrosira burmanica* although the calcium carbonate incrustation was not observed in wild specimens. Production of the calcium carbonate incrustation of this alga may be influenced by growth conditions.

It is known that the members of *Gongrosira* have biflagellate zoospores (Printz 1964, Tupa 1974). However, our alga produced quadriflagellate zoospores (Figs. 5, 11) and we never observed biflagellate zoospores during our study. In the chaetophoracean algae lacking unicellular hairs, quadriflagellate zoospores have been reported for some genera such as *Endoclonium*, *Gomontia*, *Endoderma*, *Chlorotylum* and *Nayalia* (Tupa 1974). This is the first report of quadriflagellate zoospores produced in *Gongrosira*.

In the field, this alga was found during winter to early summer. In these seasons, we could observe many colonies of black hemispherical plants of this species on stones in rivers, but could not see them in other seasons.

During spring to early summer, we could observe many zoosporangia. Sub-spherical apical cells of filaments were changed to zoosporangia in which 16 zoospores were usually formed. They were liberated through a terminal pore in the sporangial wall. Zoospores swam very rapidly and actively. After a time they lost flagella and became globose. Further development of these cells could not be traced in this study. In the cultured specimens, the formation of zoosporangia was not observed.

Skuja (1949) reported the formation of akinete in this alga, but such cells were not detected in our specimens. Sexual reproduction has never been reported in this species.

Skuja (1949) described this species based on a specimen collected from Burma. He described the habitat of this alga only as "on stone". Therefore, it is not clear whether this alga is aquatic or aerial. It is known that members of *Gongrosira* grow in aquatic habitats. All of our specimens were also collected from the surface of stones in rivers.

This species is similar to *G. disciformis* and *G. jollyi*, but it differs from the former species in having dichotomous branches spread radially from the basal portion of the plant body and from latter species in having dichotomous branches and its small cell size.

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広島県東部の 4 河川から採集した *Gongrosira burmanica* について形態、分類学的特徴、他種との区別点等について報告した。*Gongrosira* 属は淡水中の植物体、石礫上などに付着して生育する。本植物群については現在までに約 20 種が記載されているが、本邦からの報告は未だなく、今回報告した *G. burmanica* は日本新産である。本藻は河川の石礫上に半球形のコロニーを形成し、半球形の中心部から放射状に糸状体を伸ばす。糸状体は又状分枝をする。葉緑体は側壁性で深い切れ込みのある薄板状で、数個のピレノイドを有する。本属の遊走子については、すでに 2 本鞭毛のものが知られているが、今回観察した藻体では 4 本鞭毛の遊走子を形成した。この様に 2 本と 4 本の両鞭毛の遊走子を同一属に有する例はカエトフォラ目の他の属でも知られている。本藻のコロニーは野外においては冬から初夏にかけてのみ観察され、遊走子は春から初夏に形成が観察された。

□杉本順一：世界の針葉樹 302 pp. 1947. 井上書店、東京。¥5800. 針葉樹専門の邦書に推薦すべき手頃な良書がないことが、本書執筆の動機であるという。全世界に知られた針葉樹の全部について、それぞれ大要をまとめた前半（約 170 頁）と、著者の考察になる種類の検索表（約 50 頁）とより成る。新学名はないが新和名は非常にたくさん作られている。誤植がかなり目につくのが気になる。こういう本は便利なので広く使われるから、できるだけ急いで正誤表を出してほしい。（金井弘夫）